Abstract Submitted
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**Magnetic Bubble Expansion as an Experimental Model for Extra-Galactic Radio Lobes**[1] ALAN G. LYNN, YUE ZHANG, University of New Mexico, SCOTT HSU, HUI LI, WEI LIU, Los Alamos National Laboratory, MARK GILMORE, CHRISTOPHER WATTS, University of New Mexico — The Plasma Bubble Expansion Experiment (PBEX) has begun laboratory experiments and coordinated nonlinear MHD simulations to address outstanding nonlinear plasma physics issues related to how magnetic energy and helicity carried by extra-galactic jets interacts with the intergalactic medium to form radio lobe structures. Experiments are being conducted in the 4 meter long, 50 cm diameter HELCAT linear plasma device at UNM. A pulsed magnetized coaxial gun ($\sim$10 kV, $\sim$100 kA, $\sim$2 mWb) forms and injects magnetized plasma bubbles perpendicularly into a lower pressure weakly magnetized background plasma formed by a helicon and/or hot cathode source in HELCAT. Experimental parameters can be adjusted so that important dimensionless parameters are relevant to the astrophysical context. Ideal MHD simulations show that an MHD shock develops ahead of the bubble as it propagates, and that the bubble develops asymmetries due to the background field [1]. First experimental data, including magnetic probe measurements and high-speed camera imaging, will be presented. [1] W. Liu et al., Phys. Plasmas **15**, 072905 (2008).

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